STATEMENT OF

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BEFORE THE

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Madam Chairman, Members of the Subcommittee,

Thank you for this opportunity to testify today on the Bush Administration's activities for climate change technology. My testimony will cover the mission and activities of the Climate Change Technology Program; criteria and principles for climate change technology investments; and some highlights of our current climate change technology activities.

Climate Change Technology Program

As part of the President's National Climate Change Technology Initiative, launched on June 11, 2001, the President directed the Secretary of Energy, in coordination with the Secretary of Commerce and the Administrator of the Environmental Protection Agency, to lead a multi-agency review of the Federal R&D portfolio and make recommendations. The Climate Change Technology Program (CCTP) was established in 2002 to implement the President's Initiative. I am the Program's director.

The CCTP is a multi-agency research and development (R&D) coordination activity, organized under the auspices of the Cabinet-level Committee on Climate Change Science and Technology Integration (CCCSTI). Participating Federal agencies include the Departments of Energy, Agriculture, Commerce, Defense, Health and Human Services, Interior, State, and Transportation, as well as the Environmental Protection Agency, the National Aeronautics and Space Administration, and the National Science Foundation.

The mission of the CCTP is to focus Federal research and development activities and deployment programs more effectively to help achieve the President's climate change goals, both near- and long-term. The CCTP provides a forum for interagency exchange of information on on-going R&D activities. The CCTP's multi-agency organizational structure provides an opportunity to develop, across the Federal government, a comprehensive, coherent, multi-agency, multi-year plan for the development of climate change technology. We expect a draft of such a plan to be available in the first calendar quarter of 2004.

As the Subcommittee is aware, the recent *Federal Climate Change Expenditures Report to Congress* reported that total Federal expenditures for climate change technology research, development and deployment (RD&D) was $1.728 billion for FY 2003. The total amount requested in the President's budget for FY 2004 was $1.759 billion. In FY 2003, these expenditures were broken down by agency as follows: Department of Energy, $1.583 billion; Environmental Protection Agency, $106 million; and Department of Agriculture, $39 million. These amounts do not include substantial additional expenditures for climate change science ($1.722 billion) and international assistance ($276 million).

As part of our review of the Federal RD&D portfolio, CCTP is developing an inventory of Federal climate change technology activities using a set of defined criteria. This process is designed to get a more complete picture of climate change technology RD&D by ensuring that all CCTP member agencies analyze their portfolios using consistent criteria. RD&D activities classified as part of the Climate Change Technology Program (CCTP) are those activities that are relevant to providing opportunities for:

- Current and future reductions in or avoidances of emissions of greenhouse gases;
- Greenhouse gas capture and/or long-term storage, including biological uptake and storage;
- Conversion of greenhouse gases to beneficial use in ways that avoid emissions to the atmosphere;
- Monitoring and/or measurement of GHG emissions, inventories and fluxes in a variety of settings;
- Technologies that improve or displace other GHG emitting technologies, such that the result would be reduced GHG emissions compared to technologies they displace;
- Technologies that could enable or facilitate the development, deployment and use of other GHG-emissions reduction technologies;
- Technologies that alter, substitute for, or otherwise replace processes, materials, and/or feedstocks, resulting in lower net emission of GHGs;
- Basic research activities undertaken explicitly to address a technical barrier to progress of one of the above climate change technologies.
- Greenhouse gas emission reductions resulting from clear improvements in management practices.

The development of this inventory is a very important component of the CCTP's activities, and we look forward to sharing the results of this work with you and your colleagues when it is complete.

CCTP Goals and Objectives

CCTP seeks to address both the President's near- and long-term climate change goals. In the near-term, the President has committed to the goal of reducing the greenhouse gas intensity of the U.S. economy by 18 percent by 2012. Over the longer-term, the President has reaffirmed the U.S. commitment to the 1992 United Nations Framework Convention on Climate Change, which calls for long-term stabilization of concentrations of greenhouse gases in the Earth's atmosphere.

The CCTP intends to develop the technological capability that will enable both sustained economic growth and reduced risk of potential climate change and its impacts. Accordingly, the CCTP aims to accelerate the development and deployment of new technologies that can significantly contribute to the accomplishment of the President's goals.

CCTP participating agencies are pursuing research, development , and deployment activities, as appropriate to their specific agency missions, that are consistent with and supportive of the development of technology that can enable or advance the achievement of the following CCTP goals:

- Reduce or avoid emissions from energy end-use and infrastructure
- Reduce or avoid emissions from energy supply
- Capture and sequester carbon dioxide (CO_2)
- Reduce emission of non-CO_2 greenhouse gases

The achievement of these CCTP goals will be pursued, in general, by stimulating the science and technology enterprise of the United States, through coordinated Federal leadership of its own R&D programs, and through partnership with others, at home and abroad. Specifically, the CCTP seeks to pursue the following strategic objectives:

- Strengthen Climate Change Technology RD&D
- Strengthen Supporting Basic Research at Universities and National Laboratories
- Enhance Opportunities for Partnerships with Businesses, States and Others
- Increase International Cooperation on Related Science and Technology
- Support Cutting-Edge Demonstrations
- Improve the Means for Measuring and Monitoring Greenhouse Gases
- Support Exploratory Research of Novel Concepts
- Ensure the Education and Training of an Adequate Technical Workforce

The CCTP function is interagency coordination and prioritization, not direct support of research, development and deployment. As such, CCTP will not advance these objectives directly, but will help agencies and programs that comprise the CCTP to advance them by making recommendations to reallocate and refocus resources consistent with agency and program missions.

Principles for Determining Priority Programs

Our investments in climate change technology will be guided by a few basic principles, which include diversification, a logical order of technological development, systems integration, and planning in the face of uncertainty.

Diversification of research and development activity is important for several reasons:

- The potential magnitude of the technological challenge posed by climate change makes it extremely unlikely that a single technology could meet such a challenge on its own;
- A diversified portfolio is a solid hedge against the possibility that some advanced technologies may not be as successful as hoped, while others in the portfolio could exceed expectations;
- A robust, diversified science and technology capability will maintain the flexibility to respond to, and assimilate, pertinent information from other countries, institutions, or areas of scientific inquiry; and,
- A diversified portfolio is better able to balance short- and long-term technology objectives.

Sequencing of R&D investments in a logical, developmental order requires that R&D investments should be evaluated upon:

- The expected times when different technologies need to be available and cost-effective;
- The need to quickly resolve critical uncertainties; and,
- The need to demonstrate early the feasibility of determinant technologies.

These last two points help explain our increased attention to carbon sequestration research. If large-scale geologic sequestration is proved successful, then continued use of fossil fuels will be possible, and future climate change strategies could be built on existing infrastructure for fossil fuels, thus accelerating progress and avoiding early and costly retirement of this infrastructure. If large-scale geologic sequestration were to prove unsuccessful, the longer-term climate change technology portfolio will need to be

adjusted accordingly towards energy efficiency and zero-emissions technologies such as renewable energy and nuclear power.

Our R&D investments should also include attention to technology systems, including infrastructure**,** not just component technologies. The Hydrogen Fuel Initiative is an example of adherence to this principle, as it includes R&D activities on all aspects of the hydrogen system, including hydrogen production, storage, and delivery technologies, as well as fuel cells.

Finally, in setting R&D investment priorities, the CCTP recognizes uncertainty in planning for the long-term and seeks to build a robust portfolio of technical activities that can be successful under a number of economic and energy policy scenarios. While nearly all such scenarios rely heavily on further advances in energy efficiency, we will also need significant new sources of low-carbon or zero-carbon energy supply. Thus, some CCTP activities may focus on development of low-carbon fossil fuel technologies that employ carbon capture and sequestration. Other activities may focus on building a new energy backbone, envisioning increased roles for renewable energy, hydrogen, and advanced concepts for nuclear power. Some CCTP activities may be focused on the long-term, more risky, but potentially transforming technologies, such as fusion energy and advances in biotechnology. We also want to ensure that innovative, crosscutting technology ideas with significant potential to reduce, avoid, or sequester greenhouse gas emissions are not overlooked.

Priorities for the National Climate Change Technology Initiative

With these principles in mind and recognizing that not all climate change-related activities can be priorities, the CCTP will assess the inventory of CCTP activities and use professional judgment to clearly articulate its priorities in the context of the President's FY 2005 Budget. The priorities will likely be consistent with the Administration's current priorities, which are well aligned with our planning principles. Some of these priorities are highlighted below.

- **Hydrogen Energy.** President Bush launched his Hydrogen Fuel Initiative in this year's State of the Union address. The goal is to work closely with the private sector to accelerate our transition to a hydrogen economy, both on the technology of hydrogen fuel cells and a fueling infrastructure. The President's Hydrogen Fuel Initiative and the FreedomCAR Partnership launched last year will provide $1.7 billion over the next 5 years to develop hydrogen powered fuel cells, a hydrogen infrastructure, and advanced automobile technologies, allowing for commercialization by 2020. The United States will pursue international cooperation to affect a more rapid, coordinated advance for this technology that could lead to the elimination of air pollutants and a significant reduction of greenhouse gas emissions in the transportation sector worldwide.

- **"FutureGen" -- Coal-Fired, Zero-Emissions Electricity Generation.** In February 2003, President Bush announced that the United States would sponsor,

with international and private sector partners, a $1 billion, 10-year demonstration project to create the world's first coal-based, zero-emissions electricity and hydrogen power plant. This project is designed to dramatically reduce air pollution and capture and store greenhouse gas emissions. This initiative is part of an international Carbon Sequestration Leadership Forum, chaired by the Secretary of Energy, to work cooperatively with our global partners, including developing countries, on research, development and deployment of carbon sequestration technologies in the next decade.

- **Fusion Energy.** In January 2003, President Bush committed the United States to participate in the largest and most technologically sophisticated research project in the world to harness the promise of fusion energy, the same form of energy that powers the sun. If successful, this $5 billion, internationally-supported research project will advance progress toward producing clean, renewable, commercially-available fusion energy by the middle of the century. Participating countries include the United Kingdom, Russia, Japan, China, and Canada.

Conclusion

Madam Chairman and Members of the Subcommittee, these programs and others like them together constitute a diverse portfolio of energy technologies that has the potential to bring about dramatic improvements in our energy systems with significantly reduced greenhouse gas emissions. I look forward to working with the Members of this

Subcommittee as the Climate Change Technology Program moves forward in evaluating, making recommendations, and reporting progress on our technology-based approaches to address the risk of climate change.

Thank you for the opportunity to testify, and I would be pleased to answer your questions.